

Industry 4.0 and its impact on labour market

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Digital transformation

- New trends, innovations and technologies interfering in all areas of life
- New way in which economic value is being created
- The most important features:
 - Artificial intelligence (AI)
 - Internet of things (IoT)
 - 5G
 - Big data and analytical data processing
 - Edge and cloud computing
 - Blockchain

Main opportunities of Industry 4.0

- Digitization of products and services within existing portfolios
- New digital services, solutions and products
- Offers big data analysis as a service available to different clients
- Personalized products and mass customization of products
- Capture high-margin business opportunities through improved use of data analysis
- Focus on development and offer of products with high added value

Situation abroad - world leaders

- The main leaders of transformation are: Japan, Germany and China, especially in the development of horizontal production chains across borders
- China acts to prevent the growth of labour costs
 - Investments in Industry 4.0 are estimated to be about \$ 907 billion by 2020, according to research.
 - The main areas of development: sensor development, device interconnection and software application development.
 - Investments in employee training and operational changes.
 - **Expected return on investment is within approximately two years at an investment rate of 5% of their annual income.**

The situation abroad - the rate of transformation

- Global companies expect a 72 % digitization rate by 2020, compared to 33 % in 2015.
- The greatest growth rates should be in the following areas:
 - Digital business plans
 - Customer access, sales channels and marketing
 - Horizontal and vertical chains and product development and technologies
- The average reduction in operating costs should be 3.6% per year, with increased productivity of 4.1%

Source: PwC

Situation in Slovakia

- Digital economy in Slovakia produces **5,9% GDP** (as of 2016, McKinsey Digital)
- Slovakia has been facing several key problems in this area for a long time
 - Lack of investments and finances to implement Industry 4.0
 - Absence of private resources for investment in digitization processes
 - Need for incentives to motivate investment
 - Need for new development finance instruments
 - Weak support of research priorities and education development
 - **Paradox:** some recent government measures (e.g. increasing weekend/holiday surcharges) served as a driving force to implement automation in some areas (bakeries/food processing, entrance porters)

Situation in Slovakia

- Poor levels of physical and digital infrastructure
 - Obsolete forms of urban and extra-urban infrastructure
 - Absence of reforms in the field of education
 - Weak outsourcing of secure IT infrastructure and data centres
- Legal framework
 - New changes in labor relations and working conditions
 - Regulation of industrial, technological and scientific progress
 - The need to promote **public dialogue** before introducing new regulatory proposals

Situation in Slovakia - opportunities

- In Slovakia, the development of digitization can bring up to EUR 16.1 billion in additional gross domestic product (GDP) by 2025.
- This would lead to increased global competitiveness and well-being for the whole country

Expected impact on labour market

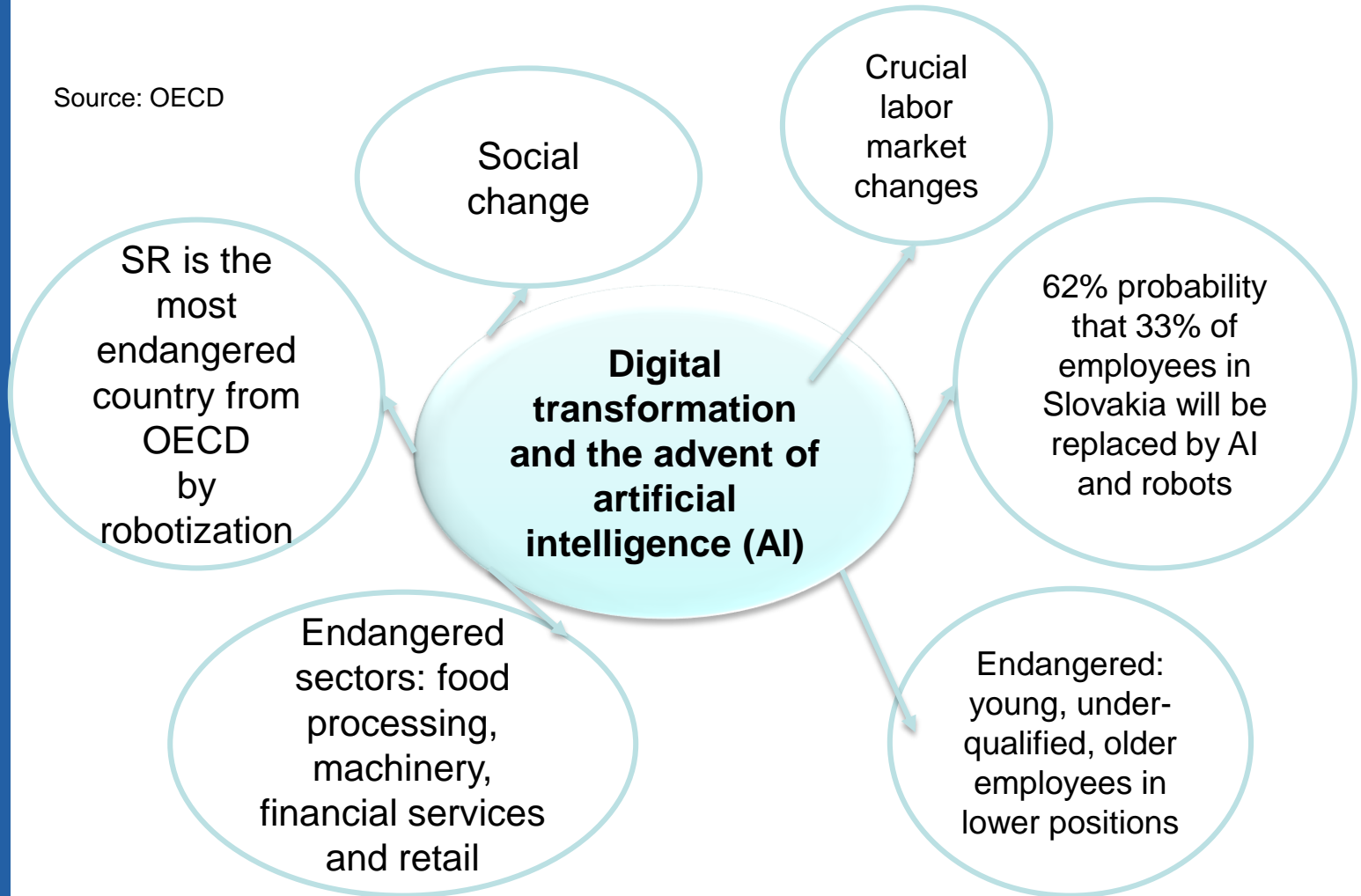
- The World Economic Forum analysis claims that Industry 4.0 will have the following impacts:
 - **Negative** impacts on existing business models as well as on the labour market
 - Loss of 5 million jobs across the top 15 economies:
 - Administrative posts: 7,1 mil. jobs
 - Moving the workforce across different service areas
 - **Positive** impact
 - Creation of new jobs in computer engineering and mathematics: 2.1 mil. jobs
- Other forecasts (Roland Berger) predict growth in total jobs
 - Industrial production losses 8.3 mil. jobs in Western European countries
 - 9,5 mil. increase in new jobs through changes in business models, investment in new industrial products and reinvesting in new services

Expected impact on labour market

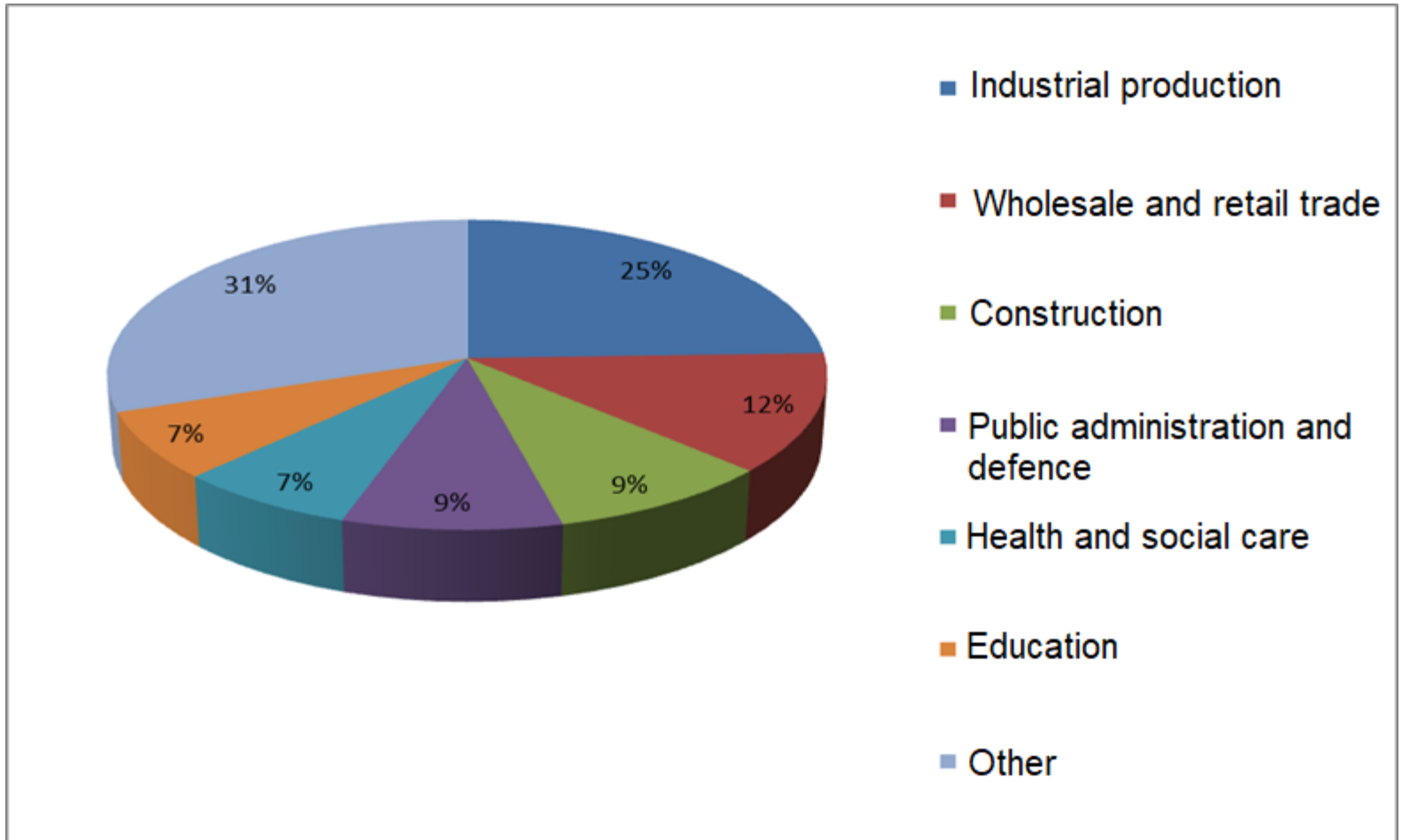
- Losses on the output side are easier to predict than revenues and a new impact related to higher productivity and lower costs
- **Ambiguity of the impacts of digital transformation**

Situation in Slovakia

Source: OECD



Employment structure 2018



Source: statistics.sk

Expected impact on employment by sectors in Slovakia (in %)

Sector	2020	2025	2030
Metal processing, system engineering, electrical engineering	-2,20	-4,70	-4,70
Other professions in processing, manufacturing and repair	-1,70	-3,00	-2,80
Inspection & servicing of machinery & equipment	-6,40	-12,70	-12,60
Storage and transport professions	-0,05	-0,15	-0,10
IT and scientific professions	2,00	3,70	3,50
Technical professions	-0,50	-1,00	-1,00
Legal and business consultancy	1,70	2,80	2,60

Expected impact on employment by sectors in Slovakia

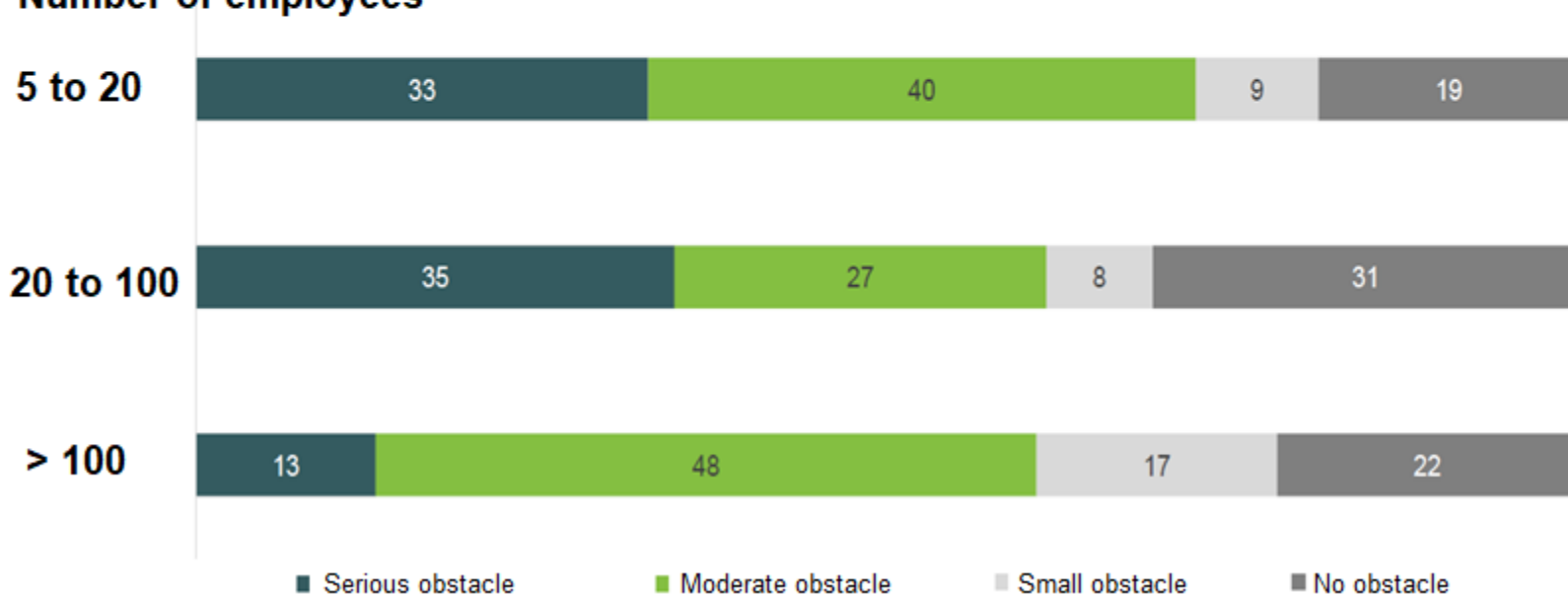
Employment by industry (1000s)	2014	2015	2016	2020	2025	2030
Industrial production	550,4	598,3	610,3	552,9	514,5	515,1
Wholesale and retail trade	284,2	296,9	310,5	311,4	312,4	312,4
Construction	223,3	213,6	229,4	231,5	233,5	233,3
Public administration and defence	211	217,3	222,4	223,0	223,2	222,8
Health and social care	175,6	181	181,5	179,8	177,8	177,9
Education	166,9	175,2	177	187,6	192,9	184,1
Other	752,2	741,9	761,2	757,9	754,1	759,7
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Economy as a whole	363,00	2 424,00	2 492,10	2 444,07	2 408,40	2 405,08

Digitalization obstacles for Slovak companies (by size, source: RÚZ and TRIXIMA)

Limited investment resources

How much is this factor an obstacle to the process of speeding up the digital transformation within your organisation?

Number of employees

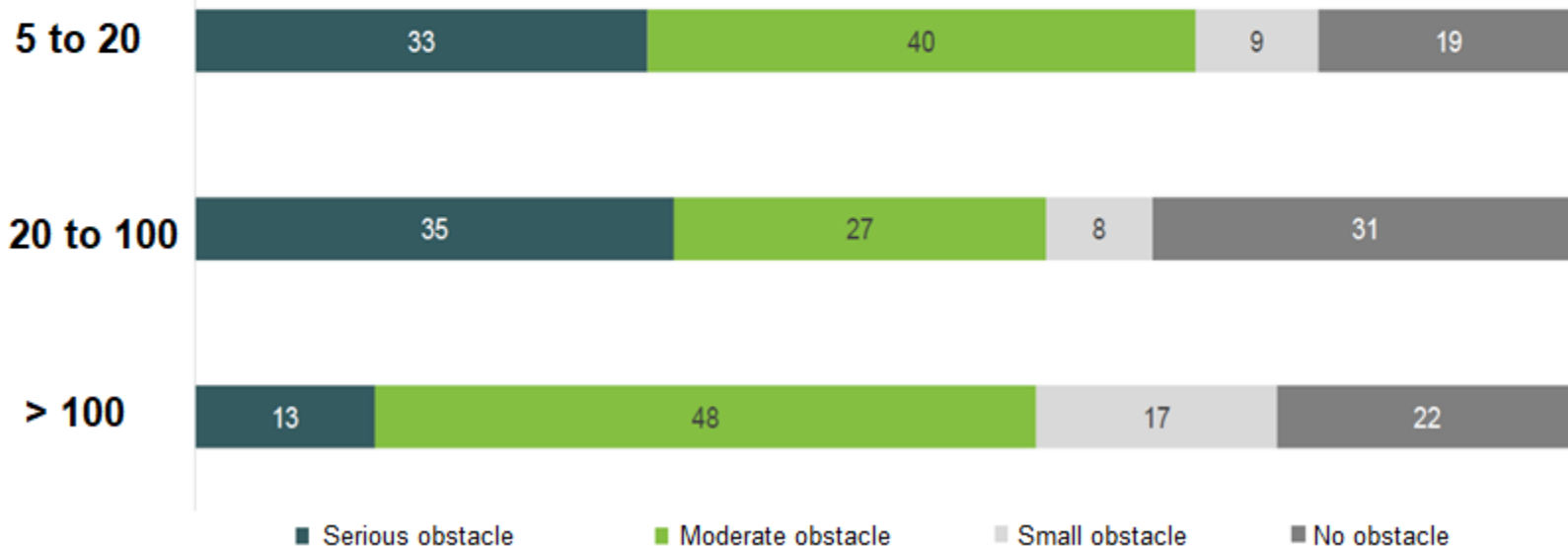


Digitalization obstacles for Slovak companies (by size, source: RÚZ and TRESIMA)

Shortage of suitable internal human resources

How much is this factor an obstacle to the process of speeding up the digital transformation within your organisation?

Number of employees



Key skills for Industry 4.0 (RÚZ survey)

- Main skills required by employers to increase their own competitiveness
- Top Priority - Skills Your Business Must Have:
 - IT knowledge and skills
 - Data and information processing and analysis
 - Statistical knowledge
 - Organizational and process knowledge
 - Ability to communicate with modern interfaces (human-machine / human-robot)

Key skills for Industry 4.0 (RÚZ survey)

- Medium Priority - Skills Your Company Should Have:
 - Knowledge management
 - Interdisciplinary / general knowledge of technologies and organizations
 - Specialized knowledge of production activities and processes
 - Awareness of IT security and privacy
- Low Priority - The skills that a business might have:
 - Computer programming / coding capabilities
 - Specialized technology knowledge
 - Knowledge of ergonomics
 - Knowledge of legal matters

Key skills for Industry 4.0 (RÚZ survey)

In terms of **personnel skills**, the priorities are:

- Top Priority - Must Have:
 - Time and personal management
 - Adaptability and ability to adapt to change
 - Ability to work in a team
 - Social skills
 - Communication skills
- Medium Priority - Skills Your Company Should Have:
 - Confidence in new technologies
 - Understanding the concept of continuous improvement and lifelong learning

Need for changes in the education system

- The crucial importance of the early stages of education and training
- Changing the setup of compulsory subjects in primary education, with an emphasis on sectors known as STEM
- Computer skills subjects should be included in the compulsory parts of basic education along with the technology curricula.
- **Secondary education: obligatory school leaving exam from mathematics (A- level, O-level)**

Need for changes in the education system

- The need to link education and practice through trainee-/internships at secondary schools and universities
- The need for pilot schemes of cooperation between companies and universities – creating an established practice applicable also to SMEs
- Increased pressure on adjustments of university and high school subjects to be in line with new trends in technology and managerial practice
- The need to develop the concept of Summer Schools across different fields

Need for changes in the education system

- The need to develop the concept of lifelong learning
 - Building on cooperation between universities, business associations and public authorities
 - New retraining programs
 - Conditions for more flexible provision of education directly within the company premises
 - Creating online learning platforms: Open University
 - Replacing the traditional emphasis on titles
- Flexibility in combining study programs
 - Combination of traditionally heterogeneous programs

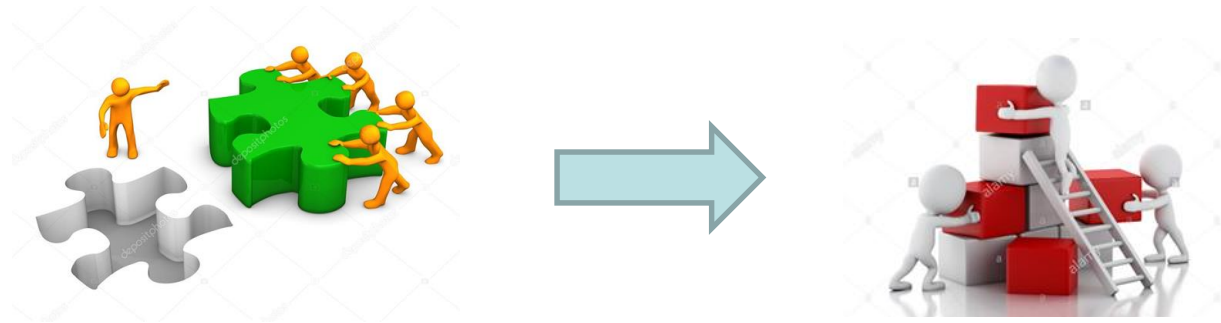
Activities of RÚZ

- **Activities at EU level (BE)**
- **Digital Coalition**
 - RÚZ is founding member (others are ITAS and UPVII)
 - Mobilizing organizations and institutions - private, public and non-profit to deal with problem of lack of digital skills
 - Goal: everybody shall dispose with sufficient digital skills in order to be productive and employable
 - By organizing trainings, short – term education activities
 - Modernization of education, requalification
 - Support of digital skills and digital competences

Activities of RUZ

TODAY:

the employee can use a well-defined set of repetitive activities in a predefined program and with the help of ICT tools



UP TO 10 YEARS:

the employee will be forced to use their logical thinking, abstract thinking, problem solving ability, ability to find and describe problem solving in a certain "language" and so on.

Activities of RUZ

Be Competent!

- Skill vs Competence - fundamental difference
- Skill: summary of activities a person can do and use in defined context
- Competence: a set of certain prerequisites for correct action in the given situation
- ICT Competence: specific cognitive performance dispositions in the field of logic, resulting in logical thinking, abstract thinking, problem solving ability...etc.
- Example: ICT skills will not be enough for AI - artificial intelligence will itself gradually replace digital skills
- General aim: Project will bring universally defined levels of control in computer science, possibility to verify the level of control of informatics on the scale A1 to B2, the ability to know the average level of IT staff in non-informatics professions

Thank you

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